Scoring for Fruit and Vegetable Screeners
(Updated 2/25/2000)

There are two recent screeners, developed at NCI. They are similar in content, except that one screener asks about fruit and other vegetables by 3 periods of day, whereas the other asks these items over all days.
The information collected from each screener can be used to estimate the total number of Pyramid servings of fruits and vegetables consumed daily. A Pyramid serving is defined by USDA as: vegetables: 1 cup leafy or ½ cup; fruit juices: 3/4 cup; and fruit: 1 whole fruit or ½ cup of cut-up fruit.

A. ALL DAY SCREENER

For the over all day screener, scoring involves two separate algorithms, one for converting the frequency information, and the other for converting the portion size information.

1. Convert reported frequency category to average daily number of times consumed:
Convert each frequency response category to the midpoint of that frequency range, and standardize to times per day:

Never=0
1-3 times per month=.066
1-2 times per week=.214
3-4 times per week=.499
5-6 times per week=.784
1 time per day=1
2 times per day=2
3 times per day=3
4 times per day=4
5 or more times per day= 5

2. Assign fruit and vegetable Pyramid Servings for each portion size category

Juice				
	.75	1.33	2.17	2.5
Fruit				
	.75	1.0	2.0	2.5
	.75	1.0	2.0	2.5
Lettuce salad				
	.5	1.0	2.0	2.5
French fries				
	1.25	2.3	3.1	4.8
Other white potatoes				
	.8	1.5	2.4	3.5

Dried beans
.75 1.5 2.5 3.5
Other vegetables
.75 1.5 3.0 4.5
Tomato sauce
.36 .72 1.45 1.7
Vegetable soups
.75 1.36 2.27 3.2

3. Compute f&v daily pyramid servings for each food group

For each food group, multiply the daily average frequency (from #1) by the portion size (from #2).

To estimate total daily number of pyramid servings, add across all foods.

NOTE that q.10 mixtures that included vegetables is not included in this algorithm. This question may be helpful in identifying individuals who eat a lot of their vegetables in mixtures. If amounts of vegetables eaten in mixtures are harder to report, their reports may be somewhat less accurate. However, this is untested so far.

4. How to handle missing data

a. Assigning reasonable data to individual questions with missing answers:

(1) Frequency of intake for individual foods

Assume Never=0, since many people don't fill in any bubble when they do not consume a food.

If portion size for that item is answered and the frequency question is not answered, continue to treat as Never.

(2) Portion size

Note: portion size is not missing if the frequency question stem above it is answered Never or assigned Never.

If a vegetable, assign the most frequently reported portion size category for all other individual vegetable questions. [Exclude "other vegetables" from this calculus, since the portions reported there may reflect portions of all other vegetables rather than a single vegetable at a time.] In order to find the most frequently reported portion size category, weight each portion size category by the relative frequency with which each portion is reported, so that the portion sizes associated with more frequently consumed vegetables are given more weight than the portion sizes associated with less frequently consumed vegetables.

If a fruit, assign the portion size category reported for the other fruit. If neither fruit juice or fruit portion sizes are reported, assign the most frequently reported portion size for vegetables.

b. When to exclude a case: (note: these exclusion criteria are being developed, and may vary from study to study)

(1) If missing frequency information on fruit or other vegetables.
(2) If nearly all questions are not answered.
(3) If any questions have more than one response answered.

B. BY MEAL SCREENER

For the by meal screener, scoring involves several stages. For the by meal questions, an algorithm for converting the frequency information is used in conjunction with an algorithm for converting the portion size information to Pyramid servings, ultimately resulting in estimates for fruits and other vegetables of daily number of Pyramid servings reported. For the remaining foods, a different algorithm for converting frequency information is used in conjunction with an algorithm for converting the portion size information.

1. Convert reported frequency by meal to average daily number of times consumed:

For each fruit question (q6, q8, q10) and each vegetable question (q7, q9, q11), convert each frequency response category to the midpoint of that frequency range, and standardize to times per day per meal:

Never=0
1-3 days last month=.066
1-2 days last week=.214
3-4 days per week=.499
5-6 days per week=.784
Every day=1

2. Assign fruit and vegetable Pyramid Servings for each portion size category

Fruit

.75	1.0	2.0	2.5
.75	1.0	2.0	2.5

Other vegetables

.75	1.5	3.0	4.5

3. Compute f&v daily pyramid servings for fruit across all meals and for vegetables across all meals

For each food group for each meal, multiply the daily average frequency (from #1) by the portion size (from #2). Sum fruit across the three meals to estimate daily average number of Pyramid servings from fruit. Sum vegetables across the three meals to estimate daily average number of Pyramid servings from vegetables.

4. For other foods, convert reported frequency category to average daily number of times consumed:

Convert each frequency response category to the midpoint of that frequency range, and standardize to times per day:

Never=0
1-3 times per month=.066

1-2 times per week=.214
3-4 times per week=.499
5-6 times per week=.784
1 time per day=1
2 times per day=2
3 times per day=3
4 times per day=4
5 or more times per day= 5

5. Assign fruit and vegetable Pyramid Servings for each portion size category

Juice
.75 1.33 2.17 2.5
Lettuce salad
.5 1.0 2.0 2.5
French fries
1.25 2.3 3.1 4.8
Other white potatoes
.8 1.5 2.4 3.5
Dried beans
.75 1.5 2.5 3.5
Tomato sauce
.36 .72 1.45 1.7
Vegetable soups
.75 1.36 2.27 3.2

6. Compute f&v daily pyramid servings for each food group

For each food group, multiply the daily average frequency (from #4) by the portion size (from #5).

To estimate total daily number of pyramid servings, add across all foods.

NOTE that q.14 mixtures that included vegetables is not included in this algorithm. This question may be helpful in identifying individuals who eat a lot of their vegetables in mixtures. If amounts of vegetables eaten in mixtures are harder to report, their reports may be somewhat less accurate. However, this is untested so far.

7. How to handle missing data

a. Assigning reasonable data to individual questions with missing answers:
(1) Frequency of intake for individual foods
Assume Never=0, since many people don't fill in any bubble when they do not consume a food.

If portion size for that item is answered and the frequency question is not answered, continue to treat as Never.

(2) Portion size

Note: portion size is not missing if the frequency question stem above it is answered Never or assigned Never.

If a vegetable, assign the most frequently reported portion size category for all other individual vegetable questions. [Exclude “other vegetables” from this calculus, since the portions reported there may reflect portions of all other vegetables rather than a single vegetable at a time.] In order to find the most frequently reported portion size category, weight each portion size category by the relative frequency with which each portion is reported, so that the portion sizes associated with more frequently consumed vegetables are given more weight than the portion sizes associated with less frequently consumed vegetables.

If a fruit, assign the portion size category reported for the other fruit. If neither fruit juice or fruit portion sizes are reported, assign the most frequently reported portion size category for the other individual vegetable questions.

b. When to exclude a case: (note: these exclusion criteria are being developed, and may vary from study to study)

(1) If missing frequency information on fruit or other vegetables.

(2) If nearly all questions are not answered.

(3) If any questions have more than one response answered.